

AMENDMENTS TO THE DRAWINGS:

Applicant has considered the Examiner's objections to the drawings. Applicant submits three replacement sheets, Figs. 1, 2, and 3, with this response. The replacement sheets provide drawings that correct "for the thick line use to better convey the structure" of the embodiment(s) shown, as required by the Examiner. The corrected drawing sheets are in compliance with 37 C.F.R. § 1.121(d). Applicant requests acceptance of the replacement drawings and withdrawal of the objection. No new matter has been added.

REMARKS

Claims 1-24 are pending in the application. Claims 1-22 have been rejected in the Office Action dated March 27, 2007. In addition, although the Office Action does not specify the status of claims 23-24, Applicant's representative, Matthew Van Eman, spoke with Supervisory Patent Examiner Eduardo Robert on June 20, 2007, and Examiner Robert indicated that the rejections based on 35 U.S.C. §103 were intended to apply to claims 23-24, as well as claims 1-22.

Claims 1-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Martin et al. (U.S. Patent No. 5,368,594) in view of Vignaud et al. (U.S. Patent No. 5,176,680) and further in view of Schlapfer et al. (U.S. Patent No. 5,501,684).

The Office Action alleges that Martin discloses each of the elements of the previously presented claims except that it does not disclose lateral undercuts, a ring placed along the pin, and a cavity capable of securing the pin with a ring about it. The Office Action states that Vignaud discloses a similar device including a split ring (9), clamping means (7, 8, and 18) and lateral undercuts. The Office Action concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Martin with the split ring and lateral undercuts of Vignaud to allow for placement of a rod in an orientation other than perpendicular to the pedicle screw in order to facilitate the positioning of the spine.

The Office Action further states that Schlapfer et al. teaches a sliding ring to allow pivoting of the screw in a bone fixation device, the ring including alternating longitudinal cuts. The Office Action alleges that it would have been obvious to one of

ordinary skill in the art at the time the invention was made to modify the split ring in the combination of Martin et al. and Vignaud et al. with the teaching of Schlapfer et al. to allow greater flexibility of the spinal rod while maintaining integrity.

§103 Rejection of Claims 1-11

Applicant traverses the rejection of claims 1-11 as being unpatentable over Martin in view of Vignaud and further in view of Schlapfer. To establish a *prima facie* case of obviousness under 35 U.S.C. § 103, the Office bears the burden of establishing each of three requirements. First, the references must teach or suggest each and every element and limitation recited in the claims. See M.P.E.P. § 2143.03. Second, the Office must establish that some suggestion or motivation exists, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references to achieve the presently claimed invention. See M.P.E.P. § 2143.01. Third, the Office must establish a reasonable expectation of success for the proposed combination. See M.P.E.P. § 2143.02.

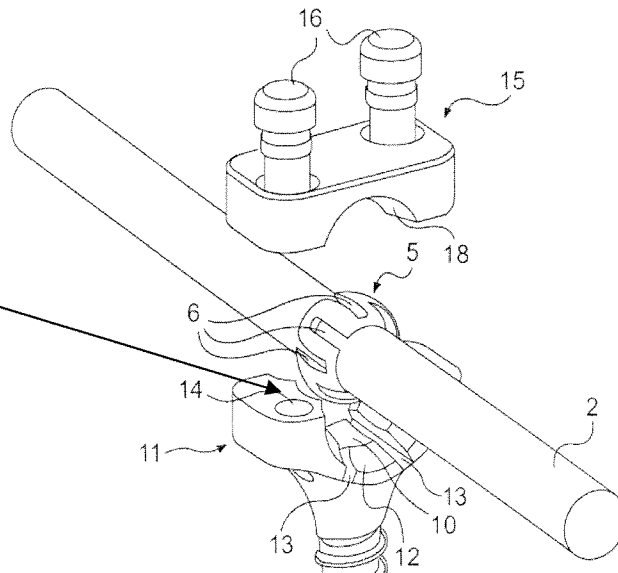
The references applied in the Office Action do not disclose each and every limitation of independent claim 1, either alone or in combination. Claim 1 recites “at least one screw for anchoring the pin to the vertebrae, each screw including: a head that delimits a cavity for receiving the pin; at least one ring having a substantially-spherical outer surface and an inside diameter allowing sliding engagement on the pin; and wherein the head of each screw is shaped so that the cavity that the head delimits may receive the at least one ring with snap-on installation.” Neither Martin nor Vignaud discloses a screw and ring “wherein the head of each screw is shaped so that the cavity that the head delimits may receive the at least one ring with snap-on installation.”

Further, Schlapfer, which the Examiner appears to have cited only based on the structural features of the ring, does not disclose a screw having any type of cavity, and therefore does not cure the defect in the rejection based on Jacques and Vignaud.

Applicant's disclosure provides a cavity "so that each ring 5 may be engaged and held inside the cavity 10 by snap-on installation." Page 5 of application. The snap-on installation allows the ring and the pin held by the ring to be secured to a screw while allowing continued angular mobility of the ring and the pin with respect to the screw as other screws are placed or other aspects of a surgery are performed.

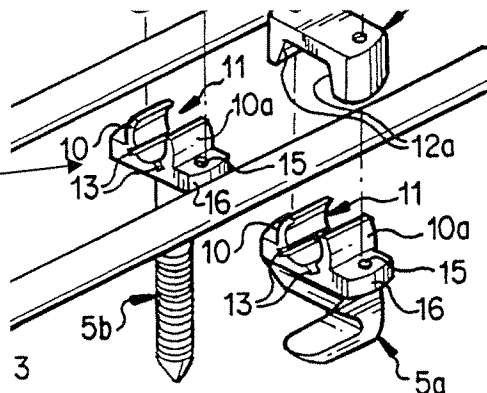
Although the device of Martin et al. may be suitable for securing a rod, Martin would not be suitable for securing a ring. The cavity recited in claim 1 provides a spherical segment that engages the spherical outer surface of a ring. This spherical configuration provides an advantage in that it allows angular movement of the rod with respect to a screw until the cap (15) is placed on the assembly. The partially spherical surface of the cavity will secure the ring in the cavity (via snap-on installation), thereby preventing the ring from sliding in the cavity in a direction along an axis of a rod secured therein, as shown in Fig. 1 of the present application, reproduced below.

Curved surface wraps around ring to hold ring and prevent ring from sliding in a direction along ring axis.

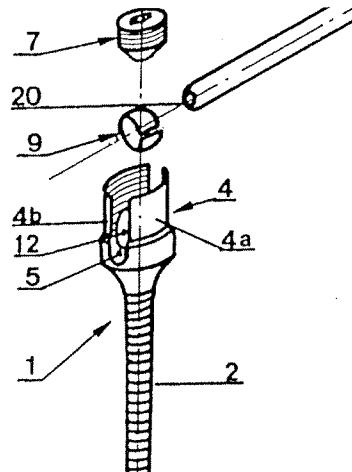


In contrast, the cavity of Martin is formed by sidewalls that have surfaces that are parallel to a surface of a rod, as shown in Fig. 3 of Martin, reproduced below. These surfaces, being parallel to the rod surface, will not surround a ring, such as the ring taught by Vignaud, to both allow angular adjustment of a rod and to prevent the ring from sliding out of the cavity in a direction along an axis of the rod.

A ring held here could slide along rod axis since projections do not curve around ring or rod in a direction along length of the rod.



Further, Vignaud also does not disclose or suggest the use of a cavity configured to receive a ring in a snap-on manner. Rather, Vignaud provides a cavity formed by branches (4a, 4b) that do not provide a snap-on engagement with the ring (9) of Vignaud, as shown in Fig. 1 of Vignaud, reproduced below.



Further, Vignaud makes it clear that it is a combination of the locking screw 7 and housing 5 that holds the ring 9 in position (see col. 2, ll. 18-30). That is, the ring 9 does not “snap-on” to the housing 5. Thus, even if one were to modify the shape of the cavity of Martin et al. to accommodate a ring, as taught by Vignaud, the device as claimed would not result. The Examiner alleges that Martin et al. teaches a snap-fit for a rod. Even if this is true, which Applicant does not concede, Vignaud does not teach or suggest that a ring may be secured via a cavity in a snap-on manner. Instead, Vignaud teaches that two separate pieces are required to secure the ring. Thus, to modify Martin et al. to include the ring of Vignaud would require eliminating the ability of Martin to receive a rod in a snap-fit manner and using the cavity structure taught by Vignaud. For this reason, the combination of Martin and Vignaud fails to render independent claim 1 unpatentable.

Schlapfer does not cure the defect with respect to Jacques and Vignaud.

Schlapfer provides an anchor element 1 seated in a spherical clamping element 2 (i.e., a ring). The Office Action indicates that the clamping element has slits formed on alternating sides of the clamping element, none of which pass all the way through the clamping element. However, Schlapfer provides no teaching of a cavity or ring configured to engage one another in a snap-on configuration.

Therefore, because none of Martin, Vignaud, and Schlapfer disclose a cavity configured to receive a ring by snap-on installation, and because the channel of Martin would not suitably secure a ring, independent claim 1 distinguishes over Martin, Vignaud, and Schlapfer in any combination. Claims 2-11 depend from claim 1, and thus are patentable over Martin, Vignaud, and Schlapfer for at least the same reasons as claim 1. Therefore, the rejection of claims 1-11 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 12-24

Applicant traverses the rejection of claims 12-24 under 35 U.S.C. §103(a) as being unpatentable over Martin et al. (U.S. Patent No. 5,368,594) in view of Vignaud et al. (U.S. Patent No. 5,176,680) and further in view of Schlapfer et al. (U.S. Patent No. 5,501,684).

Claim 12 recites at least one screw including a head having a cavity, “wherein the cavity includes an inner surface having a partially spherical contour configured to engage the outer surface of the at least one ring.” Claim 12 further recites “at least one cap having an aperture configured to contact and secure the at least one ring within the cavity, the aperture delimited by inwardly inclined side walls in a cross-section along a

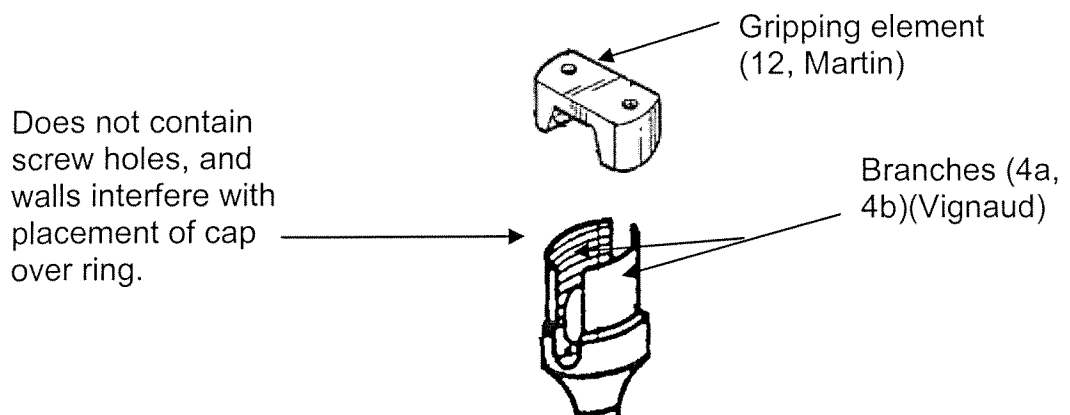
first axis of the cap.” The combination of the cavity in the screw head and the cap aperture provides a number of advantages. For example, the corresponding spherical surfaces of the ring and cavity allow a ring and rod to be secured within the cavity during a surgical procedure while maintaining angular mobility of the rod after initial positioning. Further, when a surgeon determines that it is appropriate to lock the ring and rod in place, the cap having inclined side walls can be secured over the ring, thereby preventing further angular movement.

The Office Action does not state that any of the applied references include these features. Applicant asserts that none of the references cited by the Examiner disclose the combination of a cavity with “an inner surface having a partially spherical contour configured to engage the outer surface of the at least one ring” and at least one cap including an aperture “delimited by inwardly inclined side walls in a cross-section along a first axis of the cap.”

Further, even if the individual references could be construed to include some of the claimed features, one of ordinary skill in the art would have no reasonable expectation of success in combining these features. Although Martin discloses a “gripping element 12” configured to secure a rod in place, Martin does not disclose a cavity that “includes an inner surface having a partially spherical contour configured to engage the outer surface of the at least one ring” as required by claim 12.

Vignaud discloses use of a ring 9 and Vignaud discloses a locking screw 7 including a “spherical surface 11” and a “spherical concave surface 12 at the bottom of housing 5” that work together to secure the ring 9. Vignaud at col. 2, ll. 14-30. Thus, Vignaud does not include a cap having an aperture with inwardly inclined side walls.

The gripping element of Martin (element 12) cannot be combined with the cavity of Vignaud without destroying the functionality of Martin and Vignaud. With regard to Vignaud, Vignaud teaches that “[t]he ring 9, the extremity of the locking screw 7, and the portion of the housing 5 in contact with the ring 9 are made to conform with one another in a particular way.” Col. 2, ll. 18-21. Thus, one of ordinary skill in the art would not be motivated to change the shape of the extremity of the locking screw 7. Further, the spherical surface of Vignaud’s housing 5 (surface 12) forms a very small part of the cavity in which the Vignaud ring is secured, and the majority of the Vignaud cavity is formed by projecting branches (4a, 4b). These branches are configured to receive the locking screw (7) that engages the side walls through corresponding threaded components. In addition, as shown below, the sidewalls (4a, 4b) of Vignaud contain no structure capable of engaging the gripping element (12) of Martin. For example, the branches contain no screw holes to allow the gripping element to be secured to the branches, and the branches, as designed, and will interfere with placement of the gripping element.



One of ordinary skill in the art would not modify the cavity of Martin to receive a ring as taught by Vignaud because such a cavity would not work with the gripping element of Martin. In addition, one of ordinary skill in the art would not replace the cap 8 of Vignaud with the gripping element 12 of Martin because Vignaud's cap is specially configured to accommodate the locking screw 7, which is necessary to hold the ring 9 in place.

Schlapfer does not cure the defects of Martin and Vignaud. Schlapfer provides an anchor element 1 seated in a spherical clamping element 2. The Office Action indicates that the clamping element, the ring, has slits formed on alternating sides of the clamping element, none of which pass all the way through the clamping element. However, Schlapfer provides no teaching of a cavity or cap, as recited by claim 12, and therefore does not cure the defects of Martin and Vignaud.

Therefore, none of the cited references disclose each of the limitations of independent claim 12. Further, even if the prior art could be construed to disclose the elements of claim 12, which Applicant denies, there is no expectation of success when combining such structures. Consequently, the rejection of claim 12 under 35 U.S.C. § 103(a) should be withdrawn. In addition, since claims 13-24 depend from claim 12, the rejection of claims 13-24 under 35 U.S.C. § 103(a) should be withdrawn.

Applicant additionally notes that several of the dependent claims recited additional features not found within the prior art and are not addressed by the Office Action. For example, claim 23, which depends from claim 12, recites that "the aperture of the cap has a spherical cross-section along a second axis of the cap perpendicular to the first axis." Claim 24 recites that "the aperture has a conical shape." Applicant

asserts that none of the prior art references disclose or suggest these features. If the rejections are maintained, Applicant respectfully requests that the Examiner specifically point out where the features of the dependent claims may be found in the prior art.


In view of the foregoing remarks, Applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: September 26, 2007

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